Resonance production in the STAR experiment

Md Nasim (for the STAR collaboration)

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Relativistic heavy ion collisions provide a unique opportunity for investigating nuclear matter's characteristics under extreme conditions of high temperature and density. Resonance particles, such as K^{*0} and ϕ, are considered good tools for probing the medium generated during these collisions. Specifically, K^{*0}, with a relatively short lifetime of approximately 4 fm/c, undergoes decay within the fireball, allowing its decay products to interact with the surrounding medium. Consequently, the properties of the measured K^{*0} can be altered by these in-medium interactions. In contrast, due to its significantly longer lifetime of approximately 42 fm/c, the ϕ meson primarily decays outside the fireball, allowing its decay daughters only limited time for rescattering in the hadronic phase. Thus, comparing the behaviour of K^{*0} and ϕ mesons in this context is of significant interest. Additionally, the ϕ meson is regarded as a pristine probe of partonic collectivity, given its anticipated minimal hadronic interaction cross-section. In the forthcoming presentation, we will present the invariant yield of K^{*0} and ϕ as a function of beam energy (ranging from $\sqrt{s_{NN}}$ = 7.7 GeV to 200 GeV), as measured by the STAR experiment. We will also depict the ratios of resonance to non-resonance particles (ϕ/K and K^{*0}/K) as a function of collision centrality at various beam energies. Furthermore, we will present the anisotropic flow (v_1 and v_2) of ϕ mesons, across different beam energies.